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(57) **Abstract:** Isolated nucleic acids and proteins associated with lipid and sugar metabolism regulation are provided. In particular, lipid metabolism proteins (LMP) and encoding nucleic acids originating from *Arabidopsis thaliana*, *Brassica napus*, and *Physcomitrella patens* are provided. The nucleic acids and proteins are used in methods of producing transgenic plants and modulating levels of seed storage compounds. Preferably, the seed storage compounds are lipids, fatty acids, starches, or seed storage proteins.

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